

# SYNTAX

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news**

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## SINCLAIR CONSIDERS SELLING SPECTRUM+ IN US

UK sales of the Spectrum with a QL keyboard, began upon its announcement. According to Nigel Searle, Managing Director, ZX Spectrum+ "consolidates & enhances our long-established position as market leader in the UK, where over 1 million Spectrums have been sold. With significant production volumes available immediately, this new computer will make a major impact world-wide in the 1984 Christmas market and beyond."

Spectrum+ offers full compatibility with existing Spectrum software and peripherals. Seventeen additional keys plus a space bar let many operations be performed with a single keystroke. Besides the real keyboard, You also get a reset button to clear the computer without unplugging the power.

With the ZX Expansion System, you end up with a microdrive, RS-232, and LAN.

Sinclair informs SYNTAX that they are considering selling Spectrum+ in the US. UK pricing is £180 with Tasword 2, VU-3D and four games. Interface I comes with 4 Microdrive cartridges containing a database manager, utilities and other programs at a cost of £99 in the UK.

To encourage Sinclair to sell this machine here, write to Sinclair Research, Ltd., 50 Staniford St. Boston, MA 02114.

## SINCLAIR DEVELOPS 1-MBYTE MEMORY WAFER

According to reports in EE Times, Sinclair Radionics has developed wafer-scale, serial-access memory with battery backup using a 12-year-old technique to connect low-power NMOS dynamic RAM cells in a redundant logic structure. Sinclair Radionics plans to bring these to market during 1985. Plans call for a 4-in square, 1-in thick, 1 Megabyte memory with battery backup. EE Times suggests that the price could be as low as \$250--competing strongly with conventional disks.

**SYNTAX ERRORS:** RAND USR 839 will not function as we said. To LOAD without autorun, select FAST mode and use RAND USR 837 instead. LOADING stops with report C/0 and you then LIST or SAVE the program. Thanks to H. K. Olsen of Prince George, BC for the correct method.

## NEW PRODUCTS AND SERVICES

SCRYPTIC GOLD\$ combines a 2K BASIC program, a gameboard, answer data, a program listing and a tape on which to save your program. This trivia game generates the next question from the correct answer to the previous one--but wrong answers garble the following question. Tex Micro plans tournaments with cash prizes around major holidays, with "GO" codes published in a national daily newspaper. Between contests, use the question generator to make your own puzzles. About \$30, from Tex Micro Inc. 3700 S. Hopkins, Titusville FL 32780. 305/631-1715.

Want to understand the Fifth Generation babble you hear in computer circles? Looking for a layman's introduction to Artificial Intelligence? Could PROLOG be someone's epilogue? Try THE FIFTH GENERATION Artificial Intelligence and Japan's Computer Challenge to the World. ISBN 0-451-13153-3 \$3.95 US \$4.95 in Canada.

ZX-CALC accounting model comprises a set of templates to prepare ten fundamental financial reports for sole proprietorships. Available on ZX-CALC cassette with built-in templates for \$19.95, or a printout from which you enter the templates to your copy of ZX-CALC and save the resulting program--\$8.00. Add \$1.50 S&H per item. Use with ZX/TS with 32K RAM. From AFR Software, 1605 Pennsylvania Av, #204, Miami Beach, FL 33139 305/531-6464

Budget Robotics & Computing purchased the rights to make and

sell the Computer Continuum Buffered Buss Development Board. Bare board with documentation and parts list, \$40 PPD. Works with all ZX/TS including ZX80.

RX81 boards also available for use with Buffered Buss Board or to plug direct to ZX/TS or 2068. Get 8 I/O's per board, can use several Bare board plus documentation: \$10 PPD. Budget Robotics & Computing, Box 18616, Tucson, AZ 85731.

Graphics Tablet for 2068 consists of a tablet by Koala Technologies, ZebraPainter Cassette software, and the Zebra Graphics Interface. Lets you draw hi-res pictures into your 2068 in extended color mode. All hardware and software plus manual \$119.95 From Zebra Systems, Inc., 78-06 Jamaica Av., Woodhaven, NY 11421 718/296-2385.

Centronics cable with 16K printer buffer for only \$119.95 plugs between printer and interface to give the effect of a very high-speed printer. Digital Devices Corp., 430 Tenth St., Suite N205, Atlanta, GA 30318. 800/554-4898 (in GA, 404/872-4430)

Writer's Digest Books offers its new edition--1985 Programmer's Market--edited by Brad McGehee. We checked, and find 17 listings for Timex-Sinclair software markets. If you also write for some other machines, you'll find a total of 700 markets here, plus articles and guides to the freelance business. \$16.95+\$1.50 S&H. Writer's Digest 9933 Alliance Rd, Cincinnati, OH 45242. CC orders call 800/543-4644

Monitor tuners let you use TV signals on your monitor. Connect several computers on different channels to a single monitor, or take a break and watch the news. Model MT/1 offers 60 channels with remote control (\$200) while model MT/2 tunes manually on all VHF/UHF channels (\$100). Available in many



computer stores. Illustrated literature from CARDCO, INC., 300 S. Topeka, Wichita, KS 67202.

Oddball Software tm Magazine will publish programs of use to limited audiences. It solicits submissions of software for any computer, and subscriptions. MC/VISA \$15/6 iss. Meninges Publishing, POB 1385, Pittsfield, MA 01202.

Interface Designs stopped selling HS-1 interfaces for TS1000'S, but is developing 2068 products.

The Canadian Copy Store is alleged to be at it again--now with pirate copies of UPLOAD. (The 2068 loader commissioned by SYNTAX (Dec.83) as FIRSTLOADER by David Ornstein, & sold legally on tape (in 4Q 84) as UPLOAD by E-Z Key, Zebra Systems, Ramex Intl., & E. Arthur Brown.)

#### COMPARATIVE ROM ATLAS: FROM ZX SPECTRUM TO 2068

To convert SPECTRUM software to the 2068, you need the location and function of ROM routines in each. You can buy the annotated ROM disassembly from Melbourne House or Zebra Systems. Timex sells the 2068 technical manual. Our cross-index links the two ROMs.

This atlas lists routines in order of their hex address in the SPECTRUM ROM and provides the hex address for the corresponding 2068 routine. Labels and names for the SPECTRUM routines come from The Complete Spectrum ROM Disassembly by Ian Logan and Frank O'Hara. All labels and names for 2068 functions come from Corcoran and Branigin's Timex 2068 Technical Manual.

To disassemble the TS2068 Home ROM and 8K Extension ROM (EXROM), you will need a program like HOT Z (Reviewed in SYNTAX May 84). HOT Z has a large names file which you can load along with the program to

provide subroutine names and some labels for the disassembly. HOT Z self-starts in disassembly mode, to display the Home ROM from 0000h.

In order to disassemble or use EXROM routines, you must enable the bank-switching logic, perform the desired task, then de-activate the EXROM. The 8K EXROM overlays the first 8K chunk of the 16K Home ROM.

To illustrate, the following code copies EXROM to RAM at 8000h, from which you can disassemble or display it.

```
DI           : LD BC,2000
LD A,01      : LDIR
OUT (F4),A   : XOR A
IN A,(FF)    : OUT (FF),A
SET 7,A      : OUT (F4),A
OUT (FF),A   : EI
LD HL,0000   : RET
LD DE,8000   :
```

Headscan (SYNTAX Sep.84) MC is an example of EXROM use. If you want to change the header storage location in RAM, change LD IX,FA3C to, say, LD IX,8000.

Finally, a note concerning the cassette routines of the 2068. All are located in the EXROM, but use subroutines and RST's in the Home ROM. When a call to the Home ROM or RST occurs, bank switching must take place. This adds code to the SPECTRUM documented by Logan.

Corresponding to every CALL or RST in SPECTRUM cassette routines, you find, in the TS2068 EXROM, a 23-byte code segment which starts with PUSH IX and ends with POP IX. This code preserves and sets up registers and calls the service routine at 0F99h in the EXROM. The service routine transfers the calls to the bank switching code in 2068 RAM, which in turn completes the call to the Home ROM.

N. A. Pashtoon, Port Jefferson, NY

**Closeout of old stock--NOT QUICKLOAD--tapes unlabeled, manuals photocopied.** Originally priced from \$10-40. \$8 ea, \$21/3, \$25/5 PPD.

**GULP** Run for your life, pursued by the hungry ogre.

Everybody's favorite game of maze pursuit and counterpursuit. Try to escape from the relentless ogre through five different maze formats. At the same time, accumulate points as you gulp everything in your path.

The more you gulp the angrier your pursuer gets and the faster he chases you. Nine game speeds and nine levels of difficulty let you set the pace, from moderate to frantic! Quick reflexes are a must! Caution though, highly addictive. Hardware requirement — 16K.

**SPACE INTRUDERS** Play the world famous arcade game!

The intruders are coming! 40 alien ships in each squadron! You must defend your position with the three laser guns under your command. There's no time to rest. After you defeat one squadron, another will follow, just as determined to land.

Four bases protect you, but disintegrate under the constant bombardment of the intruders. Action speeds up as the game progresses. The full score is displayed on the screen. For a change of pace, you can set the automatic option and watch the machine play itself. Hardware requirement — 16K.

**STOCK MARKET** Are you a bull or a bear? Find out in a continually fluctuating market with up to four players. You could make a bundle or lose your shirt!

The ZX81 stock market is no place for the faint-hearted. Prices of shares change continuously and randomly, and you have only a short time to decide whether to buy, sell, or pass.

"Buy low and sell high" is the object, but don't let the value of your portfolio drop to zero. You're out of luck — and out of the game — once you've lost your "stake." Fast, entertaining, educational, and enlightening. Hardware requirement — 16K.

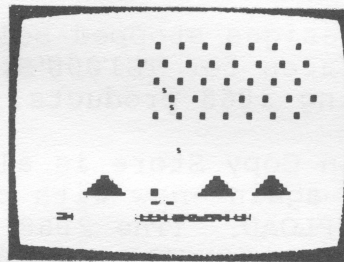
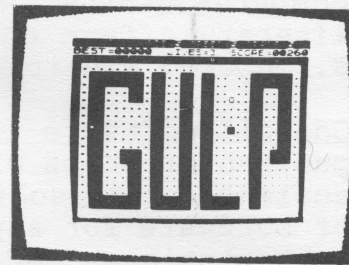
**TEXT EDITOR** A sophisticated word processor for an unbeatable price! The program includes a text editor and a formatter/printer. Unlike some word processors, training time on TEXT is minimal; an inexperienced operator can be producing perfect documents in no time at all.

The speed and convenience of on-screen editing and format planning is yours with TEXT. Lets you rewrite copy, correct errors, check spelling, change numbers — make it perfect — before you print your document. The formatter/printer justifies it and formats according to commands. Hardware requirement — 16K.

**STATISTICS** Tired of doing math by hand? Here are three programs for computing statistics rapidly and accurately.

There are three programs on the cassette. Program 1 has three parts: (1) Statistics — Calculates the current mean and the standard deviation after each value is entered. (2) Regression — calculates the current mean and the standard deviation of the X and Y values and the intercept and slope of the regression line. (3) Trend — calculates the current mean and standard deviation of the X and Y values and the intercept and slope trend lines. Program 2 enables you to perform a Chi Squared Test, and Program 3, Graphs plot, plots a graph of data entered from the keyboard. Hardware requirement — 1K.

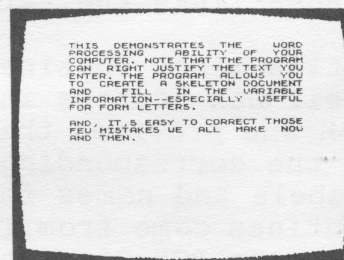
*Top Quality*



*Good*

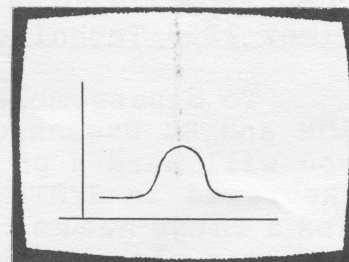
	ALAN	DEAN	SPRUE	DOGG
1	55	0	0	0
2	0	0	17	0
3	16	0	0	12
4	40	0	15	0
5	45	0	0	0
6	44	24	0	0
7	554	37	117	100
8	552	555	1010	553

*Good Challenging*



*Okay for Simple Tasks*

*Primitive, But Useful*



ORDER FROM SYNTAX

**MINDWARE**

ORDER FROM SYNTAX



SPECTRUM		TS 2068		SPECTRUM		TS 2068	
LABEL, NAME	ROM Addr	ROM Addr	LABEL, NAME	LABEL, NAME	ROM Addr	ROM Addr	LABEL, NAME
START	0000	0000	PLUGIN	CL-ATR	0E88	09C3	
ERROR-1	0008	0008		CL-ADDR	0E9B	09D6	
PRINT-A-1	0010	0010	WRCH	COPY	0EAC	0A02	K-DUMP
GET-CHAR	0018	0018		COPY-BUFF	0ECD	0A23	DUMPPR
NEXT-CHAR	0020	0020		CLEAR-PRB	0EDF	0A35	CLPR
FP-CALC	0028	0028		COPY-LINE	0EF4	0A4A	PRSCAN
BC-SPACES	0030	0030		EDITOR	0F2C	0A82	EDIT-K
MASK-INT	0038	0030		ADD-CHAR	0F81	0AE7	INSA
	004F	004F	PHLAF	ED-EDIT	0FA9	0B12	
ERROR-2	0053	0053		ED-DOWN	0FF3	0B59	
ERROR-3	0055	0055	LE3	ED-LEFT	1007	0B6B	
RESET	0066	0066		ED-RIGHT	100C	0B73	
NO-RESET	0070	0070		ED-DELETE	1015	0B7B	DELSYM
CH-ADD+1	0074	0074	NEXTCH	ED-ENTER	1024	0B8A	
TEMP-PTR1	0077	0077	NC-HL	ED-EDGE	1031	0B97	
TEMP-PTR2	0078	0078	TC-HL	ED-UP	1059	0BBF	
SKIP-OVER	007D	007D		ED-SYMBOL	1076	0BDC	
TOKENS	0095	0098	TOKENS	ED-ERROR	107F	0BE9	
KEYTBL	0227	0245		CLEAR-SP	1097	0BFE	DEL-K
KEY-SCAN	028E	02B0	K-SCAN	KEY-INPUT	10A8	0C0E	IN-K
KEYBOARD	02BF	02E1	UPD-K	ED-COPY	111D	0C83	ECHO
K-REPEAT	0310	0336		REMOVE-FP	11A7	0D0D	DESLUG
K-TEST	031E	035C	K-BASE	NEW	11B7	0D1D	K-NEW
K-DECODE	0333	0371	CHCODE	START/NEW	11CB	0D31	INIT
BEEPER	03B5	03F3	PARP	RAM-SET	1219	0D7F	NEW
BEEP	03F8	0436	BEEP	MAIN-EXEC	12A2	0E28	
PRINT-OUT	09F4	0500	SEND-TV	MAIN-1	12A9	0E2F	LED18
PO-BACK-1	0A23	053A	P-LFT	MAIN-4	1303	0ED8	LED4
PO-RIGHT	0A3D	0554	P-RT	REPORT-MSG	1391	0F65	
PO-ENTER	0A4F	0566	P-NL	MAIN-ADD	155D	1158	
PO-COMMA	0A5F	0576		CH-INFO	15AF	11AA	CHINIT
PO-QUEST	0A69	0580		INIT-STR	15C6	11C1	SMINIT
PO-TV-2	0A6D	0584		WAIT-KEY	15D4	11CF	RDCH
	0A9B	05B2	SET-AT	INPUT-AD	15E6	11E1	INCH
PO-ABLE	0AD9	05F0		OUT-CODE	15EF	11EA	PUTDIG
PO-STORE	0ADC	05F3	STTVCU	PRINT-A-2	15F2	11ED	SENDCH
PO-FETCH	0B03	061A	LDTVCU	CHAN-OPEN	1601	1230	SELECT
PO-ANY	0B24	063B		REPORT-0	160E	123D	ERRO
PO-ALL	0B7F	06B4		CHAN-FLAG	1615	1248	SEL-HL
PO-ATTR	0BDB	0710	ATTBYT	CHAN-K	1634	129A	
PO-MSG	0C0A	073F	PUTMES	CHAN-s	1642	12A8	
PO-SAVE	0C3B	0776	PR-TV2	CHAN-P	164D	12B3	
PO-SEARCH	0C41	077C		ONE-SPACE	1652	12B8	INS1
PO-SCR	0C55	0790	TVFUL?	MAKE-ROOM	1655	12BB	INSERT
REPORT-5	0C86	07C1	ERR5	POINTERS	1664	12CA	REMGSZ
TEMPS	0D4D	0888	R-ATTS	LINE-ZERO	168F	131E	
CLS	0D6B	08A6	K-CLS	LINE-NO	1695	1324	GET-LN
CLS-LOWER	0D6E	08A9	CLLHS	RESERVE	169E	132D	LCU2
CL-ALL	0DAF	08EA	CLS	SET-MIN	16B0	133F	CLEL
CL-SET	0DD9	0914	SET-CUR	SET-WORK	16BF	134E	X-CALC
CL-SC-ALL	0DFE	0939	SCRL	REC-EDIT	16D4	1363	X-T-HL
CL-LINE	0E44	097F	CLS-B	SET-STK	16C5	1354	RESET

## PROGRAMMERS' AIDS

GRAPHICS KIT 16K

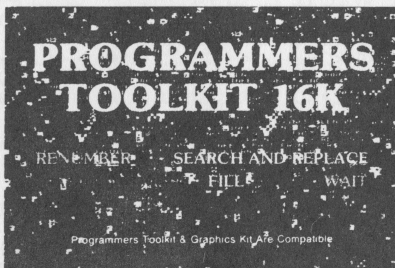
GRAPHICS KIT 16K

GRAPHICS KIT 16K

draws squares or rectangles from a specified coordinate. Because these routines are written in machine code, they are SUPER FAST. GRAPHICS KIT occupies 2K at the top of your RAM and that includes space to load PROGRAMMERS TOOLKIT described below. On loading, it repositions RAMTOP so it is protected from NEW or from being overwritten by your own program.

16K \$14.95

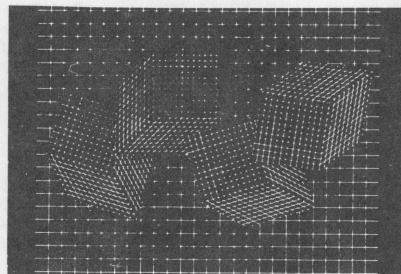
Licensed from Paul Holmes



you can Search for and List every line containing specified characters. These two unique toolkits are 'compatible' and can be loaded in RAM top together making a more powerful program aid. Buy both programs together for \$25.00

16K \$14.95

Licensed from Paul Holmes



The 32 page book contains practical examples and 'hands on' experience of using machine code programs. It also examines the TS1000/ZX81 ROM and how BASIC programs are stored in RAM. A HEX: decimal conversion routine is contained within the program.

16K \$19.95

## GRAPHICS KIT

Want to write more interesting programs on your Timex 1000 or Sinclair ZX81 computer? The GRAPHICS KIT gives you 23 exciting machine code routines to add super graphics to your program.

Routines allow you to Draw or Delete multi-character shapes, draw borders, Reverse all characters to inverse video, Fill any specified lines with any chosen characters and Search and Replace any character with another character. The KIT also has PRINT position and Scrolling controls in all directions, a Foreground and Background on/off function allows shapes to appear as if they slide behind and re-emerge from behind other shapes, and a routine which

## PROGRAMMERS TOOLKIT

Like the GRAPHICS KIT, PROGRAMMERS TOOLKIT provides machine code routines to help you write better, faster and more elaborate programs.

Some of the features are a Line Renumbering routine, including GOTO's and GOSUB's, a Free space counter tells you how many free bytes you have left and a system WAIT condition which holds a program until a signal is received in the cassette earjack.

In addition, there is a special Hyper Graphics mode which will create graphics you have never seen before on the TS1000/ZX81, a routine which instantly fills your screen with any character, and

## MACHINE CODE TEST TOOL

We brought some of these MACHINE CODE TEST TOOLS back from England for our programmers and they found them so useful we thought we should make them available for everybody who wants to experience true programming power.

This package contains a utility program and a complete tutorial course book which enables you to enter, test, display and debug hexadecimal machine code routines simply and quickly. The MACHINE CODE TEST TOOL is constructed to help the absolute beginner who wishes to explore this fascinating subject as well as the expert who wants to polish up machine code programs.

## ARCADE



MOTHERSHIP is an original arcade game written in machine code with one or two player choices, three levels of play, on-screen scoring and fast action - like you've never seen before on your TS1000/ZX81.

16K \$16.95

## MOTHERSHIP

3D GRAPHICS FOR YOUR TS1000? When you see yourself peering out of the cockpit of your Starlight Fighter, screaming down the Zarway space corridor towards the ominous MOTHERSHIP, you won't believe your eyes, because the graphics are so good.

The enemy MOTHERSHIP is maneuvering out in space preparing to take over your beloved planet. She's launching an all out attack, sending out wave after wave of drone fighters. They're pouring down the Zarway - all around you - firing deadly lasers. You can maneuver in all directions to dodge them. Knock off ten and you get a clear shot at the MOTHERSHIP, if she doesn't get you first!

## RED ALERT

Scramble on board your ship, check the computer for STATUS - The screen says you've got plenty of fuel, bombs and missiles.

And you're in the air, dodging oncoming aliens who are firing rockets at you, skimming above menacing mountains from which rockets are being fired at you. You can maneuver up and down, shooting the aliens with missiles, five at a time and dropping bombs three at a time on the mountains below.

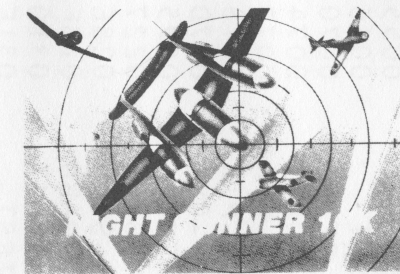
Destroy a ship for ten points, a fuel dump for 15 points and knock down an enemy missile for five points.

But watch your fuel rate—if 'empty' appears on the indicator—you're in for it. And if you lose all three of your ships, you're finished.

This fast-moving machine code graphics game is rated as the closest Timex 1000 program to an arcade game.

16K \$14.95

Licensed from Quicksilver



and harder. NIGHTGUNNER also features on-screen scoring, high score and ammunition count as well as bonus points.

16K \$14.95

Licensed from Digital Integration

## NIGHTGUNNER

You peer into the inky black sky from your position as the tail gunner in a bomber plane, searching for enemy aircraft. Suddenly, from above, a fighter plane swoops down, machine gun bullets flaring at you. You swing your tail gun into position, line up your sights and fire. "Take that, you dusty little hunchback!" you yell with satisfaction as the aircraft disappears from the sky. But such triumphs are short-lived when you play NIGHTGUNNER because there are always more enemy planes coming at you from all directions, weaving randomly. With nimble fingers you can quickly maneuver your gun in any direction and fire. But each round gets faster



SPECTRUM		TS 2068	
LABEL, NAME	ROM Addr	ROM Addr	LABEL, NAME
INDEXER	16DC	136B	SEARCH
		1374	SRCHSC
CLOSE	16E5	139F	CLOSE
	16EB	13A8	RSTSTR
CLOSE-2	1701	13BE	CLCHAN
OPEN	1736	142A	OPEN
OPEN-1	1756	145E	
OPEN-2	175D	1465	OPCHAN
CAT-ETC.	1793	25C8	CAT
AUTO-LIST	1795	14E1	LIST
LLIST	17F5	1541	K-LLST
LIST	17F9	1545	K-LIST
	1860	15AC	LPO
OUT-LINE	1855	15A1	PUT-SR?
OUT-LINE2	187D	15C9	PUT
NUMBER	18B6	1602	
OUT-FLASH	18C1	160D	FLASHA
OUT-CURS	18E1	162D	PR-CUR
LN-FETCH	190F	165B	NEXT-L
LN-STORE	191C	1668	DE-HL
OUT-SP2	1925	1671	
LINE-ADDR	196E	16D6	FIND-L
CP-LINES	1980	16E8	CP-BC
	1988	16F0	SUBLIN
EACH-STMT	198B	16F3	SUBLN1
NEXT-ONE	19B8	1720	RECLEN
DIFFER	19DD	1745	
RECLAIM-1	19E5	174D	DEL-DE
RECLAIM-2	19E8	1750	DELREC
E-LINE-NO	19BF	1768	LINENO
OUT-NUM-1	1A1B	1788	PUT-BC
OUT-NUM-2	1A28	1795	PU-LN
OUT-NUM-3	1A30	179D	
LINE-SCAN	1B17	1A27	SYNTAX
STMT-LOOP	1B28	1A44	LS4
SEPARATOR	1B6F	1AB2	
STMT-RET	1B76	1AB9	
LINE-RUN	1B8A	1AD8	EXCUTE
LINE-NEW	1AEC	1B9E	
REM	1BB2	1B00	
LINE-END	1BB3	1B09	
LINE-USE	1BBF	1B15	
NEXT-LINE	1BD1	1B27	
STMT-RET	1B76	1AB9	ENDSTT
CHECK-END	1Bee	1B44	END?
STMT-NEXT	1BF4	1B4A	ENDTEM
CLASS-01	1C1F	1B82	TEM1
REPORT-2	1C2E	1B91	ERR2
VAL-FET-2	1C59	1BBC	LT22

SPECTRUM		TS 2068	
LABEL, NAME	ROM Addr	ROM Addr	LABEL, NAME
NEXT-2-NUM	1C79	1BDC	DYADIC
CLASS-06	1C82	1BE5	TEM6
REPORT-C	1C8A	1BED	SYNERR
CLASS-0A	1C8C	1BEF	TEM10
PERMS	1C96	1BF9	
FETCH-NUM	1CDE	1C49	OPTNO
USE-ZERO	1CE6	1C51	STK-0
STOP	1CEE	1C59	STOP
IF	1CF0	1C5B	
FOR	1D03	1C78	FOR
LOOK-PROG	1D86	1D28	SKIP
NEXT	1DAB	1D55	NEXT
READ	1DEC	1D96	READ
DATA	1E27	1E82	DATA
RESTORE	1E42	1E9D	
RANDOMIZE	1E4F	1ED4	RAND
REST-RUN	1E45	1ECA	RESTBC
CONTINUE	1E5F	1EE4	CONT
GO TO	1E67	1EF1	JUMP
OUT	1E7A	1F04	
POKE	1E80	1F0A	
TWO-PARAM	1E85	1F0F	
FIND-INT1	1E94	1F1E	FIX-U1
FIND-INT2	1E99	1F23	FIX-U
REPORT-B	1E9F	1F29	ERRB
RUN	1EA1	1F2E	
CLEAR	1EAC	1F36	CLEAR
CLEAR-RUN	1EAF	1F39	CLR-BC
GOSUB	1EED	1F99	GO-SUB
TEST-ROOM	1F05	1FBB	CHK-SZ
REPORT-4	1F15	1FCF	ERR4
RETURN	1F23	1FD4	RETURN
PAUSE	1F3A	1FEF	PAUSE
BREAK-KEY	1F54	2009	BREAK
DEF FN	1F60	201D	DEF
****	****	2128	SOUND
UNSTACK-Z	1FC3	214F	
LPRINT	1FC9	2155	K-LPR
PRINT	1FCD	2159	K-PRN
PRINT-2	1FDF	217E	P-SEQ
PRINT-CR	1FF5	2194	
PRINT-ITEM1	1FFC	219B	
PR-STRING	203C	21DB	
PR-END-Z	2045	21E4	
PR-ST-END	2048	21E7	TERM?
PR-POS-1	204E	21ED	
STR-ALTER	2070	220F	STRITO
INPUT	2089	222B	INPUT
IN-ITEM-1	20C1	226B	I-SEQ

## BOOK REVIEW

Title: A Practical Guide to Machine Language Programming on the Timex/Sinclair  
Author: David B. Wood  
Pages: 250+ii (Softcover)  
Machines: ZX80 & MicroAce w/ 8K ROM ZX/TS (Usable w/ Spectrum and TS2068)  
From: SIRIUSWARE,  
6 Turning Mill  
Lexington, MA 02173  
ISBN: 0-926848-00-3  
Price: \$14.95 + \$1 P&H

I like this book. It's well written, stays on point, applies directly to your ZX/TS, includes **operable** program listings and lets you learn painlessly.

Using only 16 chapters and 8 appendices, Dave takes you on a guided tour of the Z80 in Sinclair country, distinguishing the CPU properties from the system behavior with clarity and flair. Your tour guide is an expert whose practical experience includes writing the word processor "WORD\*" on which this book is written. Appendix 4 contains Dave's assembler, written in BASIC, for you to type in and use to try routines.

Appendix six catalogs the ROM routines into nine functional areas and then provides address, exit and entrance conditions, plus a concise operational description for each.

Other appendices collect widely available reference material and organize it for use with this book.

From the following list of chapter titles you get an insight to what's covered:

- 1 Bridging the Gap
- 2 Locating Machine Code
- 3 Software Tools
- 4 Organization of Memory

- 5 Finding Your Way Around BASIC
- 6 Getting at the Variables
- 7 FAST and SLOW Mode
- 8 Manipulating Memory Space
- 9 Aborting
- 10 Writing to the TV Screen
- 11 Communication and Passing Parameters
- 12 Reading the Keyboard
- 13 Scanning BASIC
- 14 The Floating Point Calculator
- 15 The INs and OUTs of Tape Read/Write
- 16 Programming and Debugging Hints

Every chapter contains program listings that do real things--for example read a tape into a space above RAMTOP--that enable you to do something more with your machine. You don't need a lot of knowledge to use these routines, but as you use them you'll find other MC books making more sense. If you already know Z80 code, you'll get the ROM environment and utilities straight.

One of the strongest features of this book is its accuracy. All routines were re-entered from the galley proofs to make sure they did not contain typos. The assembler listing came directly from Dave's computer and 80-column printer. I found only line 6990 difficult to enter--use shift Q for the quotes enclosing the right parenthesis.

Privately, Dave told SYNTAX that most of the 8K ROM functions exist--using the same code--in the TS2068. Only the display and tape handling differ substantially. He figures about half the book applies to the 2068. By extension, a like fraction should apply to your ZX Spectrum or to the emulators.

**COVERED ZX FEEDTHROUGH CONNECTORS**  
Connector, extender PC bd., cover w side cable exit & screws. \$10 ppd  
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LABEL, NAME	SPECTRUM		TS 2068	
	ROM Addr	ROM Addr	LABEL, NAME	
IN-ASSIGN	21B9	2363		
REPORT-H	21D4	237E	ERRH	
IN-CHAN-K	21D6	2380	NOTKB?	
CO-TEMP-1	21E1	238B		
CO-TEMP-2	21E2	238C	GR-COL	
CO-TEMP-4	21FC	23A6	COLITM	
CO-TEMP-7	2234	23DE	COLOUR	
CO-CHANGE	226C	2416		
CO-TEMP-C	2273	241D	HIFLSH	
BORDER	2294	243E	BORDER	
****	****	24D2	NEWDEV	
****	****	25B9	PASSEM	
PIXEL-ADD	22AA	2603	SCRMBL	
POINT	22CB	2624	F-PNT	
PLOT	22DC	2635	PLOT	
PLOT-SUB	22E5	263E	PLOTBC	
STK-TO-BC	2307	2660	GETXY	
STK-TO-A	2314	266D		
CIRCLE	2320	2679	CIRCLE	
DRAW	2382	26DB	DRAW	
CD-PRMS1	247D	27D6		
DRAW-LINE	24B7	2810	DRAW-L	
SCANNING	24FB	2854	EXPRN	
SYNTAX-Z	2530	2889	INTPT?	
S-ATTR-s	2580	28D7	F-ATTR	
S-U-PLUS	25AF	296D		
S-LETTER	26C9	2A87		
S-FN-SBRN	27BD	2B7B		
S-SCREENS-S	2535	288E	F-SCRN	
S-RND	25F8	29B6	RND	
S-PI	2627	29E5	F-PI	
S-INKEYS	2634	29F2	F-INKEY	
FN-SKPOVER	28AB	2C69	NXT-HL	
LOOK-VARS	28B2	2C70	FIND-N	
STK-F-ARG	2951	2D0F		
STK-VAR	2996	2D54	GET-EL	
SLICING	2A52	2E10	SLICER	
STK-ST-0	2AB1	2E6F		
STK-STO-1	2AB2	2E70	PSHSTR	
STK-STORE	2AB6	2E74	PAEDCB	
INT-EXP-1	2ACC	2E8A		
DE, (DE+1)	2AEE	2EAC		
GET-HL*DE	2AF4	2EB2		
LET	2AFF	2EBD	LET	
L-ENTER	2BA6	2F64		
L-ADD-\$	2BAF	2F6D		
L-STRING	2BC6	2F84		
L-FIRST	2BEA	2FA8		
STK-FETCH	2BF1	2FAF	POPSTR	
DIM	2C02	2FC0	DIM	

LABEL, NAME	SPECTRUM		TS 2068	
	ROM Addr	ROM Addr	LABEL, NAME	
ALPHANUM	2C88	3046	ALNUM?	
ALPHA	2C8D	304B	ALPHA?	
DEC-TO-FP	2C9E	3059	STKSUM	
NUMERIC	2D1B	30D9	DIGIT?	
STK-DIGIT	2D22	30E0		
STACK-A	2D28	30E6	STK-A	
STACK-BC	2D2B	30E9	STK-BC	
INT-TO-FP	2D3B	30F9	ININT	
E-TO-FP	2D4F	3100		
INT-FETCH	2D7F	313D	LDDE	
P-INT-STO	2D8C	314A	STDE-U	
INT-STORE	2D8E	314C	STDE-S	
FP-TO-BC	2DA2	3160	FP2BC	
LOG(2+A)	2DC1	317F		
FP-TO-A	2DD5	3193	FP2A	
PRINT-FP	2DE3	31A1	OUTPUT	
CA=10*A+C	2F8B	334A		
PREP-ADD	2F9B	335A		
FETCH-TWO	2FBA	3379	SUMSLD	
SHIFT-FP	2Fdd	339C	SHIFT	
ADD-BACK	3004	33C3		
SUBTRACT	300F	33CE	SUB	
addition	3014	33D3	ADD	
HL=HL*DE	30A9	3468	MULT	
PREP-M/D	30C0	347F		
multiply	30CA	3489		
REPORT-6	31AD	356C	ERR6	
division	31AF	356E	DIVIDE	
truncate	3214	35D3	TRUNC	
RE-ST-TWO	3293	3052		
multiply	30CA	3489	TIMES	
RE-STACK	3297	3656	FLOAT	
FP calculator start:				
	32C5	3684		
CALCULATE	335B	371A	CTRO	
fp-calc-2	33A2	3761		
TEST-5-SP	33a9	3768	ROOM?	
STACK-NUM	33B4	3773	STK-M	
MOVE-FP	33C0	377F	RAMNO	
STK-DATA	33C6	3785		
SKIP-CONS	33F7	37B6		
LOC-MEM	3406	37C5	ARRAY	
get-mem-0	340F	37CF		
stk-zero	341B	37DA		
st-mem-0	342D	37EC		
EXCHANGE	343C	37FB		
series-06	346A	3829		
NEGATE	346E	382D	NEGATE	
sgn	3492	3851		
in	34A5	3864		

## BOOK REVIEW

Product: Key-finder Card  
Machines: TS2068  
Price: \$1.95  
From: Banta Software  
8088 Highwood Way  
Orangevale, CA 95662  
916/722-4895

Some things turn out more useful than you would at first think--this card is one of them. When I first got it, I stuck it on the 2068 test setup--what harm could it do? But I shift computers all day using the entire Sinclair family plus Osbornes and TRS-80's. I save a few minutes each time I use the 2068 by finding functions without scanning the whole keyboard twice.

Banta's concept is simple--a multi-column reference card with functions listed alphabetically, followed by the cursor necessary, then the key combination that produces the function.

Execution of the concept is adequate, it's printed on cardboard and designed to fit above the 2068 keyboard. The type is dot-matrix, black on matte gray. Consistent linework on the 7 sections of the table keep you from losing your place. A score mark helps you fold the upper edge to position the card

This product is so simple, you could make one yourself. What you could **not** do is make it for \$1.95!

### VAL\$ ON YOUR 2068

To see what VAL\$ does, enter:

```
100 LET a=6: LET b=9
110 LET a#="a"+"b"
200 PRINT 200,VAL a#
240 PRINT 240,VAL# "a#"
280 PRINT 280,VAL# "a#"
320 PRINT
1000 PRINT VAL# "";"a#" evaluate
ates to ";VAL# "a#"; by using t
heVAL# function and to ";VAL a#";
" by using the VAL function."
```

RUN the program and see on the display what each function does. You can use this to print both your formula and its number value from a string variable. Succinctly put, VAL\$ gives you the string that VAL evaluates, the right-hand side of the equation for A\$, by returning some steps earlier. If you have access to a Spectrum manual, you'll find its explanation clearer than that offered by Timex.

This feature is one of the subtleties implied by the statement "Sinclair machines always call the expression evaluator", and plays a role in the sometimes odd report codes that result from failures at intermediate steps.

### SINCLAIR SOFTWARE FOR ZX/TS

We found a relative handful of the original Sinclair tapes in an old New England mill. All new, in good shape. If you don't have these fun and useful programs, better move quickly. NOT AVAILABLE IN STORES. These are classic programs for ZX/TS computers. All use 16K RAM.

Complete your collection, pick up what you need now. Just these ten titles still available:

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SPECTRUM		TS 2068	
LABEL, NAME	ROM Addr	ROM Addr	LABEL, NAME
peek	34AC	386B	
usr-no	34B3	3872	
usr-\$	34BC	38D7	
TEST-ZERO	34E9	3904	TEST0
GREATER-0	34F9	3914	
NOT	3501	391C	
less-0	3506	3921	
FP-0/1	350B	3926	STB00L
or	351B	3936	
no-&-no	3524	393F	
str-&-no	352D	3948	
no-l-eql	353B	3956	
strs-add	359C	39B7	
STK-PNTRS	35BF	39DD	
chr\$	35C9	39E4	
val-&-val\$	35DE	39F9	
str\$	361F	3A3A	
read-in	3645	3A60	
code	3669	3A84	
len	3674	3A8F	
dec-jr-nz	367A	3A95	
JUMP	3686	3AA1	
jump-true	368F	3AAA	
end-calc	369B	3AB6	
n-mod-m	36A0	3ABB	INTDIV
****	****	3AC5	LDMES
int	36AF	3ACA	INT
EXP	36C4	3ADF	EXP
ln	3713	3B2E	
get-argt	3783	3B9E	ANGLE
cos	37AA	3BC5	COS
sin	37B5	3BD0	SIN
tan	37DA	3BF5	TAN
atn	37E2	3BFD	ATN
asn	3833	3C4E	ASN
acs	3843	3C5E	ACS
sqr	384A	3C65	ROOT
to-power	3851	3C6C	TO-THE
****	****	3C89	SEPRMT
(note:SEPRMT are tape msgs.)			
'spare'	386E	3CDC	'EMPTY'
charctr-set	3D00	3D00	CH-SET

The Spectrum does not support the following routines:

****	****	17B5	AROS
****	****	17CF	GETAL
****	****	17EA	AR-LN
****	****	17FF	AR-NXT
****	****	18C6	AAROS

SPECTRUM		TS 2068	
LABEL, NAME	ROM Addr	ROM Addr	LABEL, NAME
SA-BYTES	04C2	0068	W-TAPE
SA-LEADER	04D8	007E	
SA-LOOP	04FE	00A4	
SA-BIT-2	0511	00B7	
SA-8-BITS	0525	00CB	
SA/LD-RET	053F	00E5	W-BORD
REPORT-D	0552	00F8	
LD-BYTES	0556	00FC	R-TAPE
LD-BREAK	056B	0111	
LD-LEADER	0580	0126	
LD-SYNC	058F	0135	
LD-8-BITS	05CA	0170	
LD-EDGE-2	05E3	0189	RD-BIT
LD-EDGE-1	05E7	018D	RD-EDGE
LD-SAMPLE	05ED	0193	
SAVE-ETC	0605	01AB	SLVM
REPORT-F	0642	0228	
SA-NAME	064B	0231	
SA-DATA	0652	0238	
SA-V-OLD	0672	029A	
SA-V-NEW	0685	02A9	
SA-SCR\$	06A0	02F2	
SA-CODE	06C3	032E	
SA-LINE	0716	0447	
SA-ALL	075A	04C9	
LD-LOOK-H	0767	04D6	
LD-NAME	07A6	053D	
VR-CONTROL	07CB	058F	VERIFY
LD-BLOCK	0802	05C6	
LD-CONTROL	0808	05CC	LOAD
LD-DATA	082E	0606	
LD-PROG	0873	0673	
ME-CONTROL	08B6	06E5	MERGE
ME-OLD-VP	08F9	0752	
ME-ENTER	092C	0799	
ME-ENT-1	093E	07CF	
ME-ENT-3	0958	0825	
SA-CONTROL	0970	0851	SAVE
SA-1-SEC	0991	089A	

The balance of EXROM contains the Function Dispatcher, Bank Switching Code, and various other routines, which does not have counterparts in the Spectrum. A total of approximately 2K Bytes of EXROM is unused.

## TOWERS OF HANOI--8K/16K & 2068

This program demonstrates the use and manipulation of a 3-dimensional string array, N\$(R,C,9), by tracking occupancy with a numeric array, P(R,C). The program runs in slow mode; you can see blocks move.

Both ZX/TS and TS2068 versions operate in the same way, but the following analysis refers to line numbers in the ZX/TS program. You can find the equivalent lines in the color version, which has added commands to enhance the colors and different graphics that use TS2068 color to advantage.

Line 60 reserves a grid of 230 spaces (P), (10 rows (R) of 23 columns (C)). If P=1, the position is occupied. P=0 means vacant. In N\$, position R,C can be occupied by nine-character strings, shown by the third dimension of N\$, (line 40). Five strings (A\$--the blocks) will be used (line 50) and designated 1-5 (lines 70-110).

Lines 130-200 build, and 270-320 label, three platforms. Our first platform is topped with five blocks (lines 210-240). The others remain empty, for now.

FROM loop F (in lines 450-580) removes the top block (lines 490-510) (P=1) and empties the space by resetting variable P=0.

TO loop T (lines 590-710) seeks an empty space (P=0) from the bottom up, deposits the block there (line 650) and makes P=1 at the new position (line 680).

S (line 480) tabulates moves. You need at least 31. How few can you use to move all the blocks?

Enter the program listing as shown, then SAVE by using GOTO 820 for the ZX/TS version or GOTO 760 on your TS2068.

When program displays, press any key to make the game start. Exit the program with BREAK. Restart with RUN.

W. C. Andrews, San Anselmo, CA

### SOLUTION

MOVE	PIECE	FROM	TO
1	1	1	3
2	2	1	2
3	1	3	2
4	3	1	3
5	1	2	1
6	2	2	3
7	1	1	3
8	4	1	2
9	1	3	2
10	2	3	1
11	1	2	1
12	3	3	2
13	1	1	3
14	2	1	2
15	1	3	2
16	5	1	3
17	1	2	1
18	2	2	3
19	1	1	3
20	3	2	1
21	1	3	2
22	2	3	1
23	1	2	1
24	4	2	3
25	1	1	3
26	2	1	2
27	1	3	2
28	3	1	3
29	1	2	1
30	3	2	3
31	1	1	3

This program tests your moves to see if you placed a larger piece atop a smaller one. If so, you are chided and told to move it back. If you ignore the instruction, you can still cheat. In addition, it fiendishly refuses to let you put a piece back on the pile you took it from (line 440). From 1 to 3, 5 times, lets you win in 5 moves, despite the fact that the tower is completely inverted.



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 Timex-Sinclair BASIC Primer W/ Graphics 9.95  
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**ADVENTURE**



**SPACE COMMANDO**

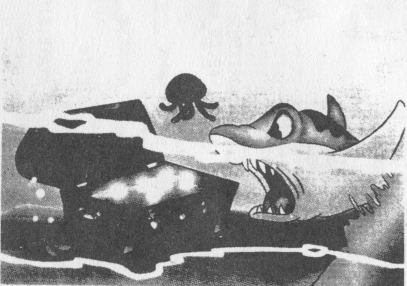
The amalgamation of friendly planets has commissioned you to infiltrate Zircon 12, a space colony overtaken by the evil Dr. Zabar and his renegade androids. Here the dreaded Dr. Zabar established a home base and research facility for his twisted experiments using the native populace of Zircon 12 as guinea pigs. Your quest is to infiltrate Zircon 12 and defeat the forces of evil so that the space fleet can land.

16K \$14.95

**SHARK'S TREASURE**

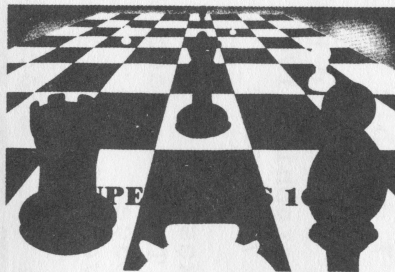
You are diving in shark infested waters in the middle of the Indian Ocean where the last known pirate ship lies wrecked on the bottom of the sea. The perils of these waters have preserved the fabulous riches that were the pirates' bounty over 100 years ago. Find the hidden treasure and escape unscathed from the jaws of death.

16K \$14.95



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SUPERCHESS is probably the most advanced chess game available for the ZX81 and TS1000 computers - so good you'll probably start to talk to it. SUPERCHESS is an extraordinary player and has many features not found in any other computer chess game. Some of the features include:

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• SUPERCHESS has a store of standard openings. • Excellent graphic board display includes a coordinate system and standard algebraic chess notation. • Up to 15 previous moves displayed. • The computer will recommend moves if you're stuck. • SELF-PLAY allows you to watch SUPERCHESS play against itself. • Detailed documentation and playing instructions are included.

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16K \$19.95

**MAZOGS**



MAZOGS is one of the cleverest, most graphically elaborate games we've ever seen for the Timex 1000 and Sinclair ZX81. You enter a complex maze which contains a glittering and fabulous treasure. But also inside the maze is a host of fearsome MAZOGS.

The program draws a different maze for each mission. You can get an overview of the whole maze, but while you're playing the game you see only the corridors which you will be running through (you control a lifelike character that actually runs through the maze). As you search for the treasure, you pick up a sword to fight off

the furious MAZOGS and find prisoners (they have dark, flashing eyes) to guide you to the treasure.

MAZOGS has three levels of play, including the adventurous level of Maniac Mobile Mazogs. MAZOGS, the only graphically illustrated adventure available for the TS1000/ZX81, is so much fun you'll find it hard to drag yourself away from it.

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One minute you're bankrolling a big-time, splashy Broadway show, the next minute you're on a one-way trip to Palookaville. That's the world of high rolling, high finance and that's ROAD TO RICHES, a game in which you're an instant millionaire and you compete to build your financial empire.

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How's your financial prowess when it comes to the risk and skill of a true entrepreneur? ROAD TO RICHES simulates the fast-moving financial world in an entertaining and educational way.

16K \$14.95



Most of the error-checking in this program can be defeated or ignored easily. But the program does a good job for an honest, cooperative user.

Many programs offer this style of writing to work. You should now add error traps so that the program can not fail. Be creative in your testing--try moving from 1 to 2, then from 2 to 1--this should not win the game! Also try from 1 to 2, 2 to 3, 2 to 3... Hmmm!

See if you can find ways to make these programs use less array space without changing the 10 by 23 part of the DIM statements. Does N\$ need 9-character strings? Does P need to be a number (7 bytes for each location)?

Can you make the anti-cheating loop put the piece back and charge you two moves?--KO

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Enter ZX/TS Graphics as follows:

```

70 3 spaces graphic eight inverse
    one graphic five 3 spaces
80 3 spaces inverse space
    inverse two inverse space 3
    spaces
90 2 spaces 2 inverse spaces
    inverse three 2 inverse spaces 2
    spaces
100 space 3 inverse spaces inverse
    four 3 inverse spaces space
110 4 inverse spaces inverse five
    4 inverse spaces
160 graphic eight 7 graphic H's
    graphic five
170 graphic eight 3 graphic H's...
    3 graphic H's graphic five
180 graphic eight 7 graphic F's
    graphic five
930 17 graphic sixes
940 inverse(space TOWERS space OF
    space HANOI space)
950 17 graphic sevens
990 5 space inverse * space...
    space inverse *... 5 space *
    inverse(space NO space NO
    space) * space
  
```

2068 First, remember the **light** part of the key symbol means **INK**. Also, we use **SS** to mean SYMBL SHIFT--hit the black & 3 keys in graphics mode to get "SS graphic three."

```

70 3 SS graphic eights 1 SS
    graphic five...1 SS graphic
    five 3 SS graphic eights
80 3 SS graphic eights space...
    space 3 SS graphic eights
90 2 SS graphic eights 2 spaces..
    2 spaces 2 SS graphic eights
100 SS graphic eight 3 spaces...
    3 spaces SS graphic eight
110 4 spaces... 4 spaces
160 SS graphic eight 7 graphic
    threes SS graphic eight
170 SS graphic eight 3 spaces...
    3 spaces SS graphic eight
180 SS graphic eight 7 SS graphic
    threes SS graphic eight
930 17 SS graphic three
940 inverse(space TOWERS space OF
    space HANOI space)
990 17 graphic three
  
```

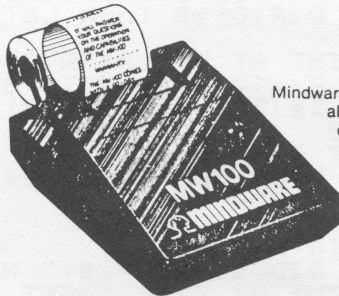


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ZX/TS VERSION

```

10 CLS
20 FAST
30 LET E#=""
40 DIM N$(10,23,9)
50 DIM A$(5,9)
60 DIM P(10,23)
70 LET A$(1)=""
80 LET A$(2)=""
90 LET A$(3)=""
100 LET A$(4)=""
110 LET A$(5)=""
120 LET S=0
130 LET N=1
140 LET R=11
150 FOR C=1 TO 23 STEP 11
160 PRINT AT R,C;" "
170 PRINT AT R+1,C;" "CHR#
(N+156);" "
180 PRINT AT R+2,C;" "
190 LET N=N+1
200 NEXT C
210 LET C=1
220 FOR R=6 TO 10
230 LET P(R,C)=1
240 NEXT R
250 GOSUB 930
260 FOR R=6 TO 10
270 FOR C=1 TO 23 STEP 11
280 IF P(R,C)=1 THEN LET N$(R,C)
)=A$(R-5)
290 PRINT AT R,C;N$(R,C)
300 NEXT C
310 NEXT R
320 SLOW
330 PRINT AT 15,14;"MOVE"
340 PRINT AT 17,8;"FROM- ";
350 IF INKEY#="" THEN GOTO 350
360 LET F#=INKEY#
370 IF F#<>"1" AND F#<>"2" AND
F#<>"3" THEN GOTO 350
380 LET F=VAL F#
390 PRINT F;" TO- ";
400 IF INKEY#="" THEN GOTO 400
410 LET T#=INKEY#
420 IF T#<>"1" AND T#<>"2" AND
T#<>"3" THEN GOTO 400
430 LET T=VAL T#
440 IF T=F THEN GOTO 400
450 PRINT T
460 PRINT AT 15,9;"
"
470 PRINT AT 15,14;"MOVE"
480 LET S=S+1
490 IF F=1 THEN LET C=1
500 IF F=2 THEN LET C=12
510 IF F=3 THEN LET C=23
520 FOR R=6 TO 10
530 IF P(R,C)=1 THEN PRINT AT R
,C;E#
540 IF P(R,C)=1 THEN LET Z#=N$(
R,C)
550 IF P(R,C)=0 THEN GOTO 580
560 LET P(R,C)=0
570 GOTO 590
580 NEXT R

```



```

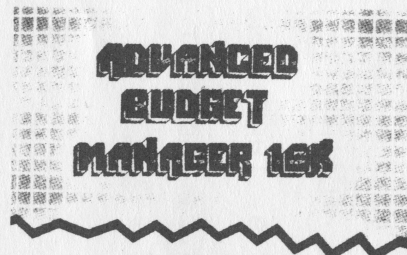
590 IF T=1 THEN LET C=1
600 IF T=2 THEN LET C=12
610 IF T=3 THEN LET C=23
620 FOR R=10 TO 6 STEP -1
630 IF P(R,C)=1 THEN GOTO 710
640 IF P(R,C)=0 THEN LET N$(R,C)
)=Z#
650 PRINT AT R,C;N$(R,C)
660 IF R>=10 THEN GOTO 680
670 IF Z$(5)>N$(R+1,C,5) THEN G
OSUB 970
680 LET P(R,C)=1
690 IF R=6 THEN GOTO 720
700 GOTO 800
710 NEXT R
720 PRINT AT 15,14;" "AT 17
,5;"YOU DID IT IN ";S;" MOVES"
730 PRINT AT 21,4;"WANT TO TRY
AGAIN? (Y/N)"
740 IF INKEY#="" THEN GOTO 740
750 IF INKEY#="Y" THEN RUN
760 CLS
770 PRINT AT 10,14;"BYE-"
780 PAUSE 4E4
790 STOP
800 PRINT AT 17,8;"
"
810 GOTO 340
820 SAVE "TOWER.S"
830 CLS
840 GOSUB 930
850 PRINT AT 3,0;"OBJECT OF THI
S GAME IS TO MOVE"
860 PRINT "FIVE BLOCKS FROM T
OWER 1 TO";"TOWER 3 IN THE SAM
E ORDER."
870 PRINT "A SMALLER BLOCK MA
Y BE PLACED ON";"A LARGER BLOCK
BUT NEVER A LARGE";"ONE ATOP A
SMALLER ONE.----THAT"
880 PRINT "COSTS EXTRA MOVES
TO RESTORE THE";"PROPER ORDER."
890 PRINT "NUMBER OF MOVES WI
LL BE SHOWN";"WHEN YOU FINISH
THE GAME."
900 PAUSE 4E4
910 CLS
920 RUN
930 PRINT AT 0,8;"=====
=====
940 PRINT AT 1,8;"TOWERS OF HA
NOI"
950 PRINT AT 2,8;"=====
=====
960 RETURN
970 FOR N=1 TO 16
980 PRINT AT 15,14;" "
990 PRINT AT 17,7;" "NO-NO
";AT 17,7;" "NO-NO"
1000 NEXT N
1010 PAUSE 90
1020 PRINT AT 17,9;"THAT/S NOT L
EGAL"
1030 PAUSE 150
1040 PRINT AT 15,9;" MOVE IT BA
CK"
1050 PRINT AT 17,9;"
"
1060 RETURN

```

SYNTACTIC SUM: 27054, 8K ROM  
INCLUDES INVERSE S IN LINE 820



## FINANCIAL



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THE ADVANCED BUDGET MANAGER is the ultimate financial program for the Timex 1000 computer because it combines a financial data base with a forecasting program.

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There are six income and 24 expense categories, all user defined. Choose from the menu to input or review data, analyze income/expense (projected and actual) by month, category or total.

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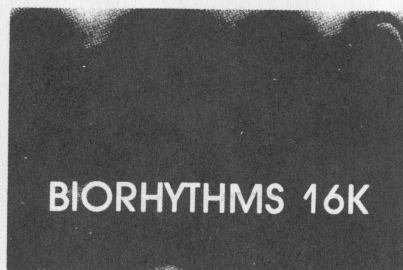
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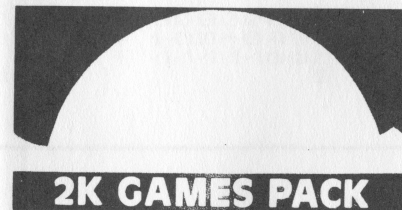
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2068 VERSION

```

4 PAPER 5
5 FOR N=0 TO 21
7 PRINT INK 5;AT N,0;"
8 NEXT N
10 BORDER 4
30 LET E#=""
40 DIM N#(10,23,9)
50 DIM A#(5,9)
60 DIM P(10,23)
70 LET A#(1)=" 1"
80 LET A#(2)=" 3"
90 LET A#(3)=" 4"
100 LET A#(4)=" 5"
110 LET A#(5)=" 6"
120 LET S=0
130 LET N=1
140 LET R=11
150 FOR C=1 TO 23 STEP 11
160 PRINT PAPER 5;AT R,C;"
170 PRINT PAPER 5;AT R+1,C;"
180 PRINT PAPER 5;AT R+2,C;"
190 LET N=N+1
200 NEXT C
210 LET C=1
220 FOR R=6 TO 10
230 LET P(R,C)=1
240 NEXT R
250 GO SUB 870
260 FOR R=6 TO 10
270 FOR C=1 TO 23 STEP 11
280 IF P(R,C)=1 THEN LET N$(R,C)=A$(R-5)
290 PRINT INVERSE 1; INK 1;AT R,C;N$(R,C)
305 IF P(R,C)=0 THEN PRINT INK 6;AT R,C;"
310 NEXT C
320 NEXT R
330 PRINT AT 15,11;"
340 PRINT FLASH 1;AT 15,14;"MOV
350 PRINT AT 17,8;"FROM- "
360 PAUSE 0
370 LET F#=INKEY#
375 IF F#(<)"1" AND F#(<)"2" AND F#(<)"3" THEN GO TO 380
380 LET F=VAL F#
390 PRINT F;" TO- ";
400 PAUSE 0
410 LET T#=INKEY#
412 IF T#(<)"1" AND T#(<)"2" AND T#(<)"3" THEN GO TO 400
415 LET T=VAL T#
420 IF T>3 OR T=F THEN GO TO 40
430 PRINT T
440 LET S=S+1
450 IF F=1 THEN LET C=1
460 IF F=2 THEN LET C=12
470 IF F=3 THEN LET C=23
480 FOR R=6 TO 10
490 IF P(R,C)=1 THEN PRINT AT R,C;E#
500 IF P(R,C)=1 THEN LET Z#=N$(R,C)
510 IF P(R,C)=0 THEN GO TO 540
520 LET P(R,C)=0
530 GO TO 550
540 NEXT R

```

```

550 IF T=1 THEN LET C=1
560 IF T=2 THEN LET C=12
570 IF T=3 THEN LET C=23
580 FOR R=10 TO 6 STEP -1
590 IF P(R,C)=1 THEN GO TO 550
600 IF P(R,C)=0 THEN LET N$(R,C)=Z#
610 PRINT INVERSE 1; INK 1;AT R,C;N$(R,C); INVERSE 0
612 IF R>=10 THEN GO TO 620
615 IF Z$(5)>N$(R+1,C,5) THEN GO SUB 1000
620 LET P(R,C)=1
630 IF R=6 THEN GO TO 660
640 GO TO 740
650 NEXT R
660 BORDER 2
665 PRINT AT 15,14;" ";AT 17,5;"YOU DID IT IN "; FLASH 1;S; FLASH 0;" MOVES"
670 PRINT AT 21,4;"WANT TO TRY AGAIN? (Y/N)"
680 IF INKEY#="" THEN GO TO 680
690 IF INKEY#="Y" THEN RUN
700 CLS
710 PRINT AT 10,14;"BYE-"
720 PAUSE 0
730 STOP
740 PRINT AT 17,8;"
750 GO TO 330
760 SAVE "TOWERS" LINE 780
780 CLS
785 GO SUB 870
790 PRINT AT 4,0;"OBJECT OF THIS GAME IS TO MOVE"
800 PRINT ,,"FIVE BLOCKS FROM TOWER 1 TO",,"TOWER 5 IN THE SAME ORDER."
810 PRINT ,,"A SMALLER BLOCK MAY BE PLACED ON",,"A LARGER BLOCK BUT NEVER A LARGE",,"ONE ATOP A SMALLER ONE."
820 PRINT ,,"THAT COSTS EXTRA MOVES."
830 PRINT ,,"NUMBER OF MOVES WILL BE SHOWN",,"WHEN YOU FINISH THE GAME."
840 PAUSE 0
850 CLS
860 GO TO 4
870 PRINT INK 2;AT 0,8;"
880 PRINT INK 2;AT 1,8;"TOWERS"
890 PRINT INK 2;AT 2,8;"
900 RETURN
1010 PRINT AT 15,14;" ";AT 17,7;"
1020 PRINT INK 2; FLASH 1;AT 15,13;"*NO-NO*"
1030 PAUSE 150
1040 PRINT AT 17,9;"THAT'S NOT LEGAL!"
1050 PAUSE 150
1060 PRINT AT 15,11;"MOVE IT BACK"
1070 PRINT AT 17,9;"
1080 PAUSE 150
1090 RETURN
SYNTACTIC SUM: 18328, TS2068

```



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